

**WOOD STORK FORAGING HABITAT
ASSESSMENT PROCEDURE**

DRAFT

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INTRODUCTION

This procedure provides a tool to assist the user in making a comparative assessment of the potential value of foraging habitat for the wood stork (*Mycteria americana*) on a land development site and on the proposed habitat compensation site, which are subject to a federal action (i.e., federal permit). This procedure should only be used after the appropriate regulatory agencies and permit applicant have agreed that foraging habitat compensation is an acceptable voluntary conservation measure for the wood stork.

The wood stork is listed as endangered and is protected under the Endangered Species Act of 1973. There is no critical habitat designated for the wood stork.

METHODOLOGY

This wood stork foraging habitat functional assessment procedure is based on information obtained from the U.S. Fish and Wildlife Service's (USFWS) Draft Habitat Management Guidelines for the Wood Stork (1990 and 2002), Florida's Fragile Wildlife (Wood 2001), Rare and Endangered Biota of Florida (Rodgers *et al.* 1996), and local field knowledge.

The functional assessment is a rating index organized similar to the format utilized in the Wetland Rapid Assessment Procedure (WRAP) developed by the South Florida Water Management District (1997). However, this assessment has been established using three variables that are indicative of the necessities and functions of foraging habitat required by the wood stork. This specific functional assessment analyzes each wetland on-site. All three variables have a maximum score of 3.0 for optimal foraging habitat (Appendix A). After each variable has been rated, the final sum is divided by nine for a mean average of all three variables. The resulting score is then multiplied by the acreage of the wetland polygon for either the development site or habitat compensation site to determine the functional units of foraging habitat provided by that wetland. The variable scores and foraging habitat functional score are summarized using a data sheet (Appendix B).

Prey Availability

The first variable is the availability of prey within the wetland assessment area. Optimal foraging depths occur in littoral areas that range from two inches to 15 inches in depth (Ogden 1990) with the water fluidity calm and without dense coverage of emergent aquatic vegetation (Rodgers *et al.* 1996). Also included in this rating index is an assessment of the wetland for small depressional pockets that will concentrate forage during a drying hydrologic regime (Ogden 1990). An optimal rating of preferred foraging habitat would score a 3.0 (Appendix A).

Hydrologic Regime

The second variable is the hydrologic regime required for wood stork foraging. Appropriate hydrological regimes for wood stork foraging for larger wetland systems or water bodies should provide indicators indicative of a longer hydroperiod for interior wetlands during the dry cycle of

the drying season along with still providing some standing water in the dry season (USFWS 2002). Also, smaller water bodies or wetlands that demonstrate shallower hydrological regimes are necessary in the initial stages of the wet season to maintain required foraging depths compared to larger and deeper hydrological areas (Ogden 1990). Furthermore, these wetlands and water bodies should have strong hydrological connections such as ditches, swales, sheetflow, etc. to provide a stable amount of hydrology for supporting the appropriate densities of fish as prey (Rodgers *et al.* 1996). These three hydrological ratings are necessary to determine appropriate staging levels for adequate supplies of foraging prey and foraging depths. A combination of all above mentioned ratings would be considered as optimal hydrological regimes to supporting foraging habitat (Appendix A).

Water Quality

The third variable assesses if the appropriate water quality is prevalent in the assessment wetland. It has been determined that the presence of chemicals such as fertilizers, pesticides, and herbicides can adversely impact prey species for the wood stork (Wood 2001). Also, elevated levels of organochlorine pesticides, PCBs, and mercury have been identified in small samples from wood storks (Rodgers *et al.* 1996). Therefore, an appropriate rating of the localized water quality is necessary to determine possible impacts to the wood stork. The rating index utilized is the same water quality, pre-treatment index utilized in WRAP (South Florida Water Management District 1997). This method evaluates the contributing areas to the wetland. This rating index is determined by the summation of the land use category with the pre-treatment category divided by two. The maximum score of each category is 3.0 (Appendix A).

SUMMARY AND DISCUSSION

This procedure provides a tool in making a comparative assessment between impacts to wood stork foraging habitat resulting from a land development project and the proposed foraging habitat compensation. The habitat variables of prey availability, hydrologic regime, and water quality all play a role in determining the ecological function that a wetland provides for wood stork foraging.

This functional assessment provides a rating index for foraging habitat and does not assess roosting or nesting habitat. Rogers (*et al.* 1996) establishes that nesting habitat for colonies is optimal on isolated islands or in woody vegetated areas surrounded by vast areas of open water. Wood (2001) explains three to five feet in water depths is adequate to deter predators such as raccoons and skunks. These water depths also provide areas for alligators, which also may deter land based predators (Wood 2001). Night time roosting within the project site will be dependent on the locality of the nearest nest colonies. Ogden (1990) explains nesting storks traveling long distances (more than 40 miles) may feed at a site and roost nearby and travel back to the colony the following day. If nesting or roosting occurs on the project site, then additional variables would need to be considered if this assessment procedure is to be used to assess nesting and roosting habitat. This procedure also does not assess human induced disturbances. Wood (2001) found that nesting wood storks have a somewhat higher tolerance to human disturbances than other wading birds. General observations of wood storks feeding on roadside swales and water management lakes also indicate their comfort zone for human disturbances while foraging.

REFERENCES

- Ogden, J.C. 1990. Habitat Management Guidelines for the Wood Stork in the Southwest Region. U.S. Fish and Wildlife Service. Pgs. 1-7.
- Rodgers, J.A., H.W. Kale, II, and H.T. Smith. 1996. Rare and Endangered Biota of Florida. Volume V. Birds. University Press of Florida. Gainesville, Florida. Pgs.31-41.
- South Florida Water Management District. 1997. Wetland Rapid Assessment Procedure (WRAP) Technical Publication. Second Edition. Natural Resource Management Division Regulation Department. South Florida Water Management District.
- Wood, D.A. 2001. Florida's Fragile Wildlife Conservation and Management. University of Florida. Gainesville, Florida. Pgs. 178-193.
- U.S. Fish and Wildlife Service. 2002. Draft Habitat Management Guidelines for the Wood Storks in the South Florida Ecological Services Consultation Area. Vero Beach, Florida.

APPENDIX A

RATING INDICES FORAGING HABITAT VARIABLES

1. Prey Availability

Descriptions	Score
<ul style="list-style-type: none"> ➤ Wetland or water body provides two to 15 inches of littoral depth for foraging purposes for the majority of the foraging area ➤ Wetland or water body provides relative calm fluidity and without dense coverage of aquatic vegetation ➤ Wetland contains many small depressional pockets for forage to become concentrated 	3.0
<ul style="list-style-type: none"> ➤ Wetland or water body provides two to 15 inches of littoral depth for at least half of the foraging area ➤ Wetland or water body provides a calm fluidity motion with a few patches of dense aquatic vegetation ➤ Wetland contains scattered depressional pockets for forage to become concentrated 	2.0
<ul style="list-style-type: none"> ➤ Wetland or water body provides two to 15 inches of littoral depths for at least some of the foraging area ➤ Wetland or water body provides a calm fluidity motion with scattered patches of dense aquatic vegetation ➤ Wetland contains few depressional pockets for forage to become concentrated 	1.0
<ul style="list-style-type: none"> ➤ Wetland or water body does not provide littoral foraging areas with two to 15 inches in depth ➤ Wetland or water body does not provide a calm fluidity motion or has extreme coverage of dense aquatic vegetation 	0.0

2. Hydrologic Regime

Descriptions	Score
<ul style="list-style-type: none"> ➤ Wetland or water body provides indicators indicative of longer hydroperiods for interior wetlands during the drying cycle of the dry season ➤ Wetland or water body provides indicators indicative of a short hydroperiod during the wet season to provide littoral foraging of appropriate depths when larger wetlands and water bodies are too inundated ➤ Wetland or water body has a strong hydrological connection such as ditches, swales, sheetflow, etc. that provides more permanent hydrology to make available necessary fish densities for foraging 	3.0

2. Hydrologic Regime (Continued)

Descriptions	Score
<ul style="list-style-type: none"> ➤ Wetland or water body provides evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season ➤ Wetland or water body provides evidence of very few hydrological alterations during the wet season that will provide littoral foraging of appropriate depths when larger wetlands and water bodies are inundated ➤ Wetland or water body has an adequate hydrological connection such as ditches, swales, sheetflow, etc. that provides more permanent hydrology to make available necessary fish densities 	2.0
<ul style="list-style-type: none"> ➤ Wetland or water body provides evidence of a moderately altered hydroperiod for interior wetlands during the drying cycle of the dry season. ➤ Wetland or water body provides evidence of a moderately altered hydroperiod during the wet season that will provide some littoral foraging at appropriate depths when larger wetlands and water bodies are inundated ➤ Wetland or water body has moderate hydrological connections such as ditches, swales, sheetflow, etc. that provides adequate hydrology to make available necessary fish densities 	1.0
<ul style="list-style-type: none"> ➤ Wetland or water body provides evidence of a severely altered hydroperiod for interior wetlands during the drying cycle that provide no available foraging habitat ➤ Wetland or water body provides evidence of a severely altered hydroperiod during the wet season that provide no littoral areas when other areas have extreme inundation ➤ Wetland or water body has no hydrological connection such as ditches, swales, sheetflow, etc. that could provide adequate hydrology for necessary fish densities 	0.0

3. Water Quality

Land Use Category	Score
Open Space/Natural, Undeveloped Areas	3.0
Unimproved Pasture/Rangeland	2.5
Citrus Grove	2.0
Sugar Cane	2.0
Low Density Residential	2.0
Low Density Commercial	2.0
Low Density Highway	2.0
Institutional	2.0
Single-family Residential	1.5

3. Water Quality (Continued)

Land Use Category	Score
Recreational	1.5
Golf Course	1.5
Moderately Intense Commercial	1.5
High Volume Highway	1.0
Industrial	1.0
Mining	1.0
Multi-family Residential	1.0
Improved Pasture	1.0
Row Crop	1.0
High Intensity Commercial	0.5
Dairy or Feed Lot	0.0
Pretreatment Category	
Natural, Undeveloped Areas	3.0
Wet Detention with Swales	2.5
Wet Detention with Dry Detention	2.5
Combination Grass Swales with Dry Detention	2.0
Grass Swales Only	1.0
Dry Detention Only	1.0
No Treatment	0.0

APPENDIX B

**WOOD STORK FORAGING HABITAT ASSESSMENT
PROCEDURE DATA SHEET**

Wood Stork Foraging Habitat Assessment Procedure

☒ Check One
☐ Existing Conditions ☐ Proposed Conditions

USACOE Appl. No. USFWS Log No. Project Name Date Evaluator Project/Mitigation Site

FLUCFCS Code Description Wetland Acreage Wetland Number

Prey Availability

Hydrologic Regime

Water Quality

Land Use Category (LU)			
Land Use Category	(Score) X	(% of area)	=Sub Total
(LU) Total			<input type="text"/>

Pretreatment Category (PC)			
Pretreatment Category	(Score) X	(% of area)	=Sub Total
(PC) Total			<input type="text"/>

Score

Notes

Prey Availability

Hydrologic Regime

Water Quality